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ABSTRACT

Two experiments examined the effects of definition and synonym as context clues embedded in three types of text (fiction, exposition, and science). It was predicted that (1) type of text would influence clue usage; (2) difficulty of the text, based on increasingly more detailed complex information, would interfere with the use of clues; (3) clue type would influence the use of clues; and (4) high ability subjects would make more effective use of clues than low ability subjects. The subjects, 24 eighth grade students in the first experiment and 40 in the second, read three passages with four nonsense words embedded in each, then supplied a true English word for each pseudoword and the reason for replacement. Context clues for the pseudowords were systematically varied by type (definition and synonym) and by direction (before or after the target word). Results of both studies showed that high ability students outperformed average and low ability students, indicating a greater verbal ability and more effective use of clues. Both studies reported similar effects for types of texts, with the fiction passages eliciting more correct responses than the science texts. The modifications to the expository passages across experiments reinforced the stylistic differences between fiction and science texts, suggesting that different writing styles may require different reading processes. Type of clue (definition or synonym) and clue direction (before or after the target word) did not substantially affect word identification or clue usage. (An appendix contains the passages read by the students.) (RL)

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The Influence of Text Type and Context Clue Type on the Comprehension of Unknown Words

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The present paper attempts to examine the effectiveness of two different categories of context clues embedded in three different types of text in facilitating word comprehension by readers of different ability levels. The importance of context as a determinant of word meaning has been emphasized by researchers in the field of reading who have stressed the relationship between the use of context and vocabulary development (Dulin, 1969). Several different kinds of studies have explored the nature and use of context clues. A majority of studies has been based on a generalized response to context rather than a specific response to particular kinds of context; overall conclusions drawn are that context clues do facilitate the comprehension of word meaning, that there is a high positive correlation between ability and effective usage, and that instruction in clue recognition and usage is significant in effective clue usage (Dulin, 1969; Biemiller, 1970; Weber, 1970; Gipe, 1978; Carroll, Madison, and Drum, 1980).

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A second type of study has investigated the effective placement of target words within sentence context for maximum clue value. Aborn and Rubenstein (1957) discovered that context is generally most effective when the unknown target word is placed in the center of a sentence, there being a greater likelihood of a correct response than a total preceding or following context. Madison, Carroll, and Drum (1981) studied, instead, the placement of clues relative to the target word, looking specifically at directionality (clue before and after the target word) and proximity (relative closeness to the target word). They concluded that direction influenced clue usage, being more effective in the after position for high ability students and in the before position for low ability students, and that close proximity to the target word made the clue more effective for both ability groups.

A third type of study has explored the area of classifying clue types. Ames (1966) found 14 unique categories of clues by post hoc analysis of student responses. His graduate student subjects read fiction stories and non-fiction articles with pseudowords substituted for every 50th word, each containing the same number of letters as the original word and composed of syllable combinations that approximated a true English word. The subjects read each passage and then responded in personal interviews as to what the real English word should be and their reasons for it. Ames, however, did not make an attempt to analyze the effectiveness of clue type nor the effectiveness of text type in which the clues were embedded.

Quealey (1969) replicated Ames' study with senior high school students and concluded that his subjects used the same clues, although with less accuracy. Rankin and Overholser (1969) also replicated Ames'

study with upper elementary students but used a cloze technique rather than substituting nonsense words and an objective context test to measure clue sensitivity. They conducted a more complete analysis of subjects' use of clues and found a difference in the frequency in which clue types were used. In none of the context clue studies do the authors consider the overall effect of passage type in which clues are embedded.

This study was designed to examine the effective use of the two most frequently mentioned types of context clues—definition and synonym--(as determined by Rankin and Overholser), embedded in three different types of text--fiction, exposition, and science--in determining the meanings of unknown words by 8th grade students. In addition, the directionality variable, clue before or after the target word, was reexamined for ability effects. It was predicted that type of text would influence clue usage with fiction, exposition, and science ranked from more to less effective; it was felt that difficulty of the text, based on increasingly more detailed, complex information, would interfere with the use of clues. It was also predicted that clue type would influence the use of clues, with definition being more influential than synonym, based on Rankin and Overholser's findings. It was expected that higher ability subjects would make more effective use of clues than lower ability subjects, but that there would be an interaction between ability and directionality of clue, as reported in Madison et al.

Experiment One

Method

Subjects. Subjects participating in this study were 24 8th grade students from a junior high school of lower-middle to middle SES. They were divided

into two groups by high and low reading ability. Level of ability was determined by teacher evaluation and corroborated by standardized test score results (California Test of Basic Skills).

Materials. Materials consisted of three passages (Appendix A), each approximately 200 words in length, and varied as to topic, author style, and text type. Passage 1 was fictional, a boy-meets-girl story; passage 2 was expository, a biography of a famous baseball player; and passage 3 was scientific, a description of the planet Earth. Four content words were deleted from each passage, and a pseudoword composed of syllable combinations that would approximate a true English word was substituted. Context clues for these pseudowords were systematically varied by type and direction. Two types of clues, definition and synonym, were evenly divided over the target words, with half the clues coming before the word and half after the word. Proximity was controlled, with all clues within five words of the target pseudoword. All three passages were taken from 5th grade level curriculum materials. Passages were counterbalanced across trials to control for position bias. Two scorers reviewed and agreed on the appropriateness of clue type and text type.

Procedure. Folllowing Ames' and Quealey's studies, an introspective approach was used to collect data; each student was interviewed separately, with no time limit imposed, and their answers were tape-recorded. After being instructed that they would read three passages with four nonsense words substituted in each and asked to supply a true English word for each pseudoword and the reason for the replacement, each student read each passage silently and then responded as to 1) what English word would fit the place of the nonsense word, and 2) what specific clue

within the passage helped to determine what the real word should be. They were given the opportunity of making any notes they wished on the written passages to aid in their answering.

Scoring. In evaluating word replacement responses, the exact word or acceptable dictionary synonym with correct tense and grammatical structure was required. In evaluating clue identification responses, the specific clue embedded in the passage was required. The scoring procedure was a 0 for a wrong answer and a point for a right answer for both word replacement and clue identification.

Results and Discussion

The research design included one between subject variable, ability (high and low), and three within subject variables, prose type (fiction, exposition, and science), with directionality (before/after) and clue type (synonym/definition) crossed with passages. There were two dependent measures, word replacement and clue identification.

As shown in Table 1, there were substantial main effects for ability level, type of prose, clue direction for response accuracy for the two dependent measures. The general finding showed that, as expected, high ability students outperformed low ability students on both dependent measures (Table 1). Treatment effects for prose type, clue type, clue direction, and any substantial interactions for the dependent measures are examined in subsequent sections. All two way and higher order interactions with F values less than 1 have been combined into a single general test with the combined residual error term.

Text Type. Type of text was highly influential (Table 1), with fiction and exposition passages receiving more correct responses than science.

It was originally felt that the exposition passage would rank midway between fiction and science in reading difficulty; while the fiction passage used a chronological order with a single sequence of events to tell a story, the purpose of exposition would be to convey specific information on a restricted topic, although with less technical vocabulary than the science passage. However, the three types of text were not as distinctive as expected. Upon reexamining the expository passage used, it simulated the ficiton characteristics using a modified chronological order in presenting the career of a famous baseball player who also served as a protagonist.

An interaction between text type and dependent measures (Table 1) showed that for the fiction and expository passages, the clue identification scores were higher, while the word replacement scores were higher for the science passage (Table 2). This was due perhaps to science requiring a more precise word response, while fiction and exposition were less restricted in requiring an exact word.

Clue Type. Clue type did not differ overall (Table 1). In reexamining the clues used, their lack of distinction could be a limitation of the study itself, in that the clues were not made sufficiently unique. A further consideration is the difficulty in completely controlling for passage clues. While attempting to embed specific clues, the context of the passage itself provided clues. There was an interaction between passages and clue types (Table 1), showing that for the fiction passage, the definition clue was more effective for a correct response, while in the exposition and science passages, the synonym clue was more effective (Table 2). Here, a one-word synonym may lend itself to a more terse, detailed type text.

Clue Direction. Direction of clue made a difference overall (Table 1), with clues in the before position relative to the target word being.

more effective than the after position. There was an interaction between clue direction and text type (Table 1), showing that the before clue was more effective for both fiction and exposition passages, while the after clue position was more effective for the science passage (Table 2). A reason for this may be that the position of the clue lends itself to reader prediction of the content. Both fiction and exposition passages were less detailed than science and likely made fewer demands on the reader's attention; the reader could anticipate the upcoming text. The science passage, on the other hand, is more precise in its wording, expecting a definite answer. Until the reader comes to the nonsense word, attention is focused on the details of the text; at the pseudoword, the reader may then begin to look for the text to explain it.

In order to further explore the use of prose type and to see if the original findings could be replicated, a second experiment was planned.

In the second experiment, the same dependent measures were tested but with modifications as to passage text, subject grouping, method of collecting data, and scoring procedures. In modifying the passages, clues were rewritten to be more distinctive while a different expository passage was used that was more similar to the science passage than the fiction passage. Subjects were divided into experimental and control groups and then divided by ability to investigate whether the presence of specific clues aided readers as opposed to general context clues. Data collection was changed to an intact class test to investigate the differences between one-to-one and written techniques. The scoring procedure was felt to be too limiting in analyzing student responses and consequently expanded to five categories of word scores and four categories of clue scores.

Experiment Two

Method

Subjects. Forty 8th grade students served as subjects; they were divided into two groups, experimental and control, with half of each group being able readers and half being average readers. Reading ability was determined by teacher evaluation and corroborated by standardized test score results (Metropolitan Achievement Test).

Materials. The same fiction and science passages were used, with revised embedded clues. Because the results for the biographical expository passage had resembled that of fiction, a new expository passage on passenger liners was selected. The passage is descriptive-comparative with a number of details but not presented in chronological order and with no protagonist. The details include descriptions of an imagined cruise ship from a novel compared to an actual cruise ship (Appendix A). The control group received unaltered passages while the experimental group received passages that were rewritten to deliberately embed clue conditions. Again, the same nonsense words were used, and the same clue types served, with half coming before and half after the target words. Passages were counterbalanced across trials to control for position bias.

Procedures. The students were tested as an intact class, with instructions to read each passage, noting the nonsense words, and when finished to respond in writing as to what the real English word should be and what clues within the passages helped to determine their answers. No time limit was imposed.

Scoring. In evaluating the word replacement responses, the scoring procedure was a point in one of five categories - exact word used, a

synonym, an answer appropriate to the passage, an answer inappropriate to the passage, and no response. In evaluating the clue identification responses, the scoring procedure was a point in one of four categories- the embedded clue, an appropriate clue found in the general context of the passage, an inappropriate clue, and no response. Two scorers reviewed and agreed upon 10 of the 40 tests at .97.

Results and Discussion

Experimental and Control Groups. While there was not a significant difference between experimental and control groups, there was a trend for the experimental group to score higher (Table 3) on word replacement scores and clue identification scores. Correct responses for word replacement were determined by summing exact word, synonym, and appropriate response. The sum of exact clue and appropriate clue was used for clue identification. The lack of main effect is probably due to the context of the passages providing some clues, thereby enabling control students to respond at least appropriately. To further explore this possibility, a test of levels of word replacement types for experimental versus control was examined. As seen in Figure 1, the experimental group performed much better on the exact word with the control group responding best on appropriate answers, $F(3,108) = 3.25$, $p < .02$. There was also a trend for the experimental group to score higher on accurate clues versus inappropriate clues, $F(1,36) = 3.55$, $p < .07$, with the experimental group generally selecting more appropriate clues (Figure 1).

Ability. High ability students performed better than average ability students (Table 3). An interaction between ability and text type (Table 3) showed that while high ability students performed approximately the same on the three passages, average ability students performed best on fiction, then exposition, and worst on science, thus supporting the original

hypothesis. There were also interactions between ability and word replacement scores, $F(3,108) = 4.22$, $p < .01$, and clue identification scores, $F(1,36) = 19.7$, $p < .00$. On word replacement scores, high ability students performed better using the exact word, a synonym, and then an appropriate answer, while average ability students performed approximately the same in all responses. On clue identification, high ability students also outperformed the average ability students with a higher response mean for appropriate clues.

Text Type. Type of text was highly influential (Table 3) with fiction receiving more correct responses than exposition and science. Interactions between text type and word replacement scores, $F(6,216) = 2.77$, $p < .01$, and clue identification scores, $F(2,72) = 22.31$, $p < .00$, showed that fiction, exposition, and science were ranked highest to lowest in mean responses for both word and clue scores (Figure 2). While in the first study exposition response scores were closer to those of fiction, here the expository passage scores were closer to the science passage, showing the expository shift from fictional resemblance to a more detailed, science resemblance.

Dependent Measures. Word responses recieved better scores than did clue identification (Table 3). Within word replacement scores there was a main effect, $F(3,108) = 7.72$, $p < .00$, with highest response scores on appropriate answers, exact word, synonym, and inappropriate answers, respectively. A possible reason for this ranking is the high mean for appropriate answers by the control group; without specific clues, responses could not be expected to be specific to the exact word. Within clue identification responses, there was also a main effect, $F(2,72) = 22.31$, $p < .00$, for both the exact word and story clue to do well compared to the inappropriate clue.

Experimental Group Only. As with the combined testing groups, high ability students outperformed average ability students (Table 4) on both dependent measures. Prose also followed the same pattern, with fiction and exposition receiving higher responses than science (Table 4), with a similar interaction between ability and text type (Table 4). Treatment effects for clue type and clue direction, and any substantial interactions are examined next.

Clue Type. As in the first study, clue type did not differ overall (Table 4). There was an interaction between passages and clue types (Table 4) showing again that the definition clue was more effective for a correct fiction response, while the synonym clue was more effective for the exposition and science passages (Table 5).

Clue Direction. Clue direction relative to the target word made a difference overall (Table 4), with clues in the after position being more effective, as opposed to the first study. While there was a trend for high ability students to score well on before clues and for low ability students to score approximately the same on both positions in the first study, average ability students scored highly on the after clue position in the second study with high ability readers scoring only somewhat higher on the after clue position. Contrary to both studies, Madison et al. reported no main effect for clue direction, although there was a trend for the after clue position to be more effective, and an interaction between ability and clue direction with the high ability readers doing significantly better on the after clue condition. These results are more similar to the results of this second study. There was an interaction between type of clue and clue

direction (Table 4), with the before clue position being highly more effective for definition type clues and the after position being only slightly more effective for the synonym type clues (Table 5). This may be due to the fact that the descriptiveness of a definition type clue predisposes the reader to anticipate and recognize the target word. There was also an interaction between prose and clue direction (Table 4) with the before clue being more effective for the science passage and the after clue more effective for both fiction and exposition (Table 5). The wide variation among results for clue directionality indicates that direction by itself may not be an important determiner of performance in these studies.

General Discussion

The purpose of the two studies reported was to examine the effectiveness of two different categories of context clues embedded in three different types of text, based on the much-reported theory that context is indeed a determiner of word meaning. While a clue categorization scheme was devised, based on graduate student responses and replicated by high school student responses, the effectiveness of clue type was not investigated nor was the type of text.

Results of both studies showed that high ability students did outperform average-low ability students, indicating a greater verbal ability. Differences between ability groups was demonstrated in several ways. In the interview situation, high ability students averaged 12 minutes per interview while low ability students averaged 20 minutes. Strategies used in responding were similar in both studies; while high ability students almost always used appropriate text clues, lower ability students tended to use the immediate sentence context, resulting in

inappropriate word replacement. The lower ability groups also tended to use the nonsense word itself as a clue, resulting in a target word look-alike for word replacement responses.

Both studies reported similar effects for types of texts, suggesting that different writing styles may require different reading processes. This fiction may be easier to read due to its chronological order and single sequence of events, while greater attention is required by a science passage. The expository passage is similar to both in that it is has general information such as the fiction passage but also specific, factual information as does science. A shift in the exposition passage from resembling fiction in the first study to resembling science in the second study resulted in a similar shift in response results.

Type of clue did not make a difference, even when deliberately revised in the second study to improve clue distinction. Perhaps these two clue types are too close in type, and that other clue comparisons would show a difference. As previously mentioned, there is also a difficulty in deleting all clues from a text, as the context of a passage itself will provide clues to maintain text continuity.

Clue direction varied in both studies as well as in Madison et al. With such diverse findings, no conclusion can actually be drawn; perhaps Aborn and Rubenstein's conclusion that context is generally most effective when the unknown target word is placed in the center of a sentence is a more accurate picture.

While there was no main effect for dependent measures in the first study, there was a trend for word replacement scores to be higher than clue identification scores, similar to the main effect found in

Experiment Two. One reason for this difference could be in the two techniques used in collecting data. In the first study, each student was interviewed separately and responded to direct questions; consequently, there were very few no responses (5%) compared to the written no responses (18%) in the second study.

Educational Implications

Empirical evidence has demonstrated the effectiveness of context in facilitating word comprehension; the ability to use context well, in fact, underlies mature reading. While students are encouraged to use the context of a reading selection, their efforts in being successful will vary according to their mastery of this skill; instructional implications would be, then, for the direct teaching of clue recognition and employment, together with appropriate practice. In instruction, ability level of the student should be considered, as these studies have demonstrated the less effective use of clues by low ability students even with appropriate level reading materials. Developing meaning through using contextual aids has been described as a problem-solving task, which is correlated highly with high ability; low ability students, then, require more instruction and practice.

Type of text should also be considered with attention to reading difficulty and text purposes, e.g., fiction for casual reading as compared to technical for specific details; knowing what, where, and when to look for clues is based on the particular selection being read. While the use of context will not necessarily provide specific and multiple meanings of a word, the student should recognize that context surrounding any textual segment can help in determining the meaning of that segment.

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Table 1. ANOVA for

Treatments for Experiment One

Source	ss	df	F	p	Mean
Ability (high/low)	12.84	1	23.39	.00	(out of 24) (21.53/14.20)
error	12.07	22			
Prose (fiction/exposition/ science)	1.26	2	3.98	.02	(out of 8) (6.10/6.00/5.10)
error	7.32	46			
Direction (before/after)	.84	1	4.94	.03	(out of 12) (9.42/8.50)
error	3.91	23			
Clue (synonym/definition)	.01	1	.04	.85	(out of 12) (8.35/9.00)
error	4.07	23			
Dependent Measures (word/clue)	.01	1	.13	.71	(out of 12) (8.05/9.00)
error	1.08	23			
Prose*Direction	4.35	2	9.06	.00	
error	10.90	46			
Prose*Clue	2.93	2	10.85	.01	
error	12.48	46			
Prose*Dependent Measures	.35	2	8.75	.03	
error	2.07	46			
All nonsignificant interactions	7.51	48	1.39		
error	25.25	240			

Table 2. Experiment One

Averages for Text Type by Dependent Measures, Clue Types, and Clue Direction

	Fiction		Exposition		Science	
	M*	SD	M*	SD	M*	SD
Dependent Measures						
Word	2.92	0.82	3.13	1.41	2.00	0.89
Clue	3.08	0.82	3.29	1.63	2.63	0.98
Clue Type						
Synonym	2.58	1.33	3.38	1.33	2.96	1.17
Definition	3.42	1.03	3.04	1.83	2.54	1.52
Clue Direction						
Before	3.46	1.03	3.54	1.97	2.42	1.33
After	2.54	1.26	2.88	1.60	3.10	0.98

*out of a possible 4

Table 3, Experiment Two - ANOVA

for Treatments for Experimental and Control Groups

Sources	SS	df	F	p	Mean
Group (experimental/ control)	4.27	1	2.90	.09	(out of 24) (17.40/15.80)
Ability (high/average)	45.07	1	30.66	.00	(out of 24) (19.20/14.00)
error	54.60	37			
Prose (fiction/exposition/ science)	61.11	2	35.11	.00	(out of 8) (6.95/4.98/4.68)
Prose*Ability (high fic/exp/sci low fic/exp/sci)	8.41	2	4.83	.01	(out of 8) (7.3/6.5/5.9) (6.6/3.8/3.1)
error	68.48	76			
Dependent Measures	4.27	1	5.41	.03	(out of 12) (8.70/7.89)
error					
All insignificant interactions	2.47	3	.75		
error	29.53	72			

Table 4. Experiment Two

ANOVA for Treatments for Experimental Group

Source	SS	df	F	p	Mean
Ability (high/average)	8.01	1	18.95	.00	(out of 24) (20.5/14.3)
error	7.61	18			
Prose (fiction/exposition/ science)	4.99	2	11.10	.00	(out of 8) (7.0/5.3/5.2)
Prose*Ability	1.75	2	3.90	.03	
error	8.09	36			
Direction (before/after)	1.01	1	5.88	.02	(out of 12) (8.15/9.25)
error	3.24	19			
Clue (synonym/definition)	.53	1	1.89	.19	(out of 12) (9.10/8.15)
error	.52	19			
Dependent Measures (word/clue)	.53	1	2.32	.16	(out of 12) (9.1/8.3)
error	4.38	19			
Prose*Direction	2.40	2	7.50	.00	
error	6.01	38			
Prose*Clue	3.68	2	7.36	.00	
error	9.82	38			
Clue*Direction	1.41	1	7.30	.02	
error	3.67	19			
All insignificant interactions	1.31	26	.55		
error	21.84	234			

Table 5. Experiment Two

Averages for Text by Ability, by Clue, and by Direction

	Fiction		Exposition		Science	
	M*	SD	M*	SD	M*	SD
Ability						
High	7.3	.48	6.7	.48	6.5	.49
Average	6.6	.52	3.9	.53	3.8	.53
Clue						
Synonym	6.3	.52	5.9	.53	5.7	.52
Definition	7.6	.48	4.1	.53	4.9	.54
Direction						
Before	6.4	.48	4.2	.53	5.7	.55
After	7.5	.43	6.1	.53	4.9	.52

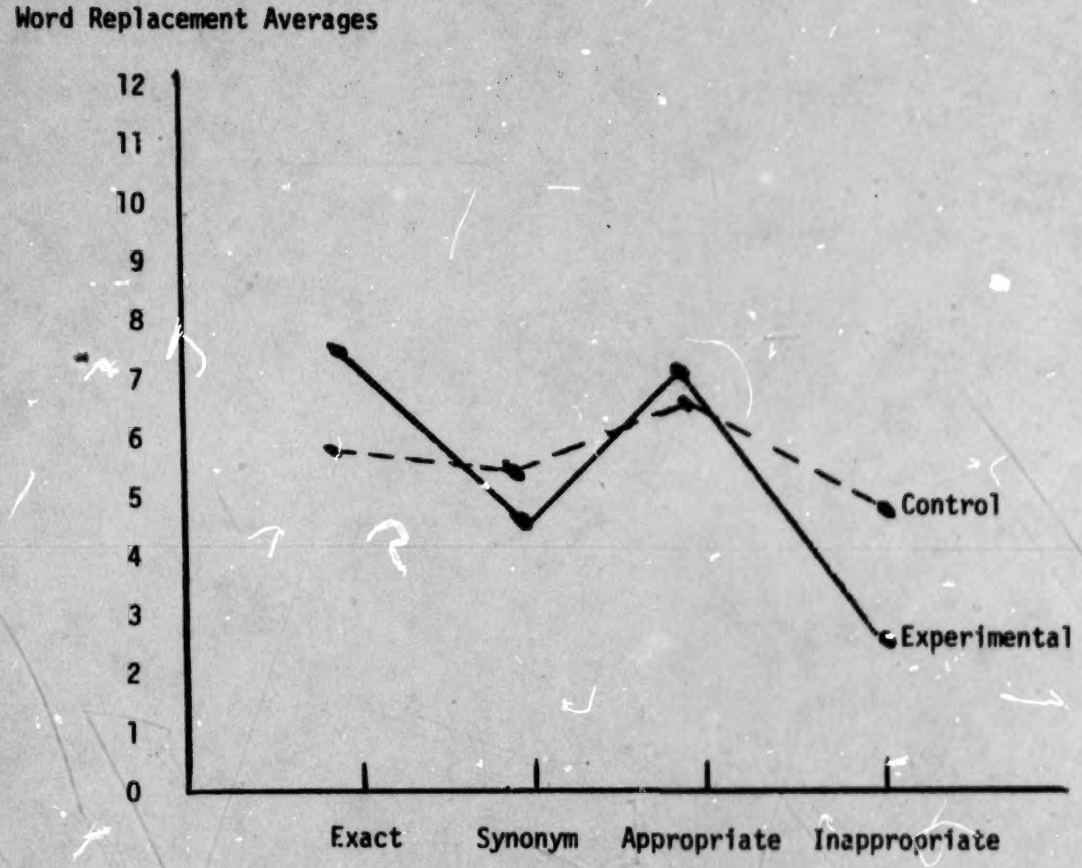
*out of a possible 8

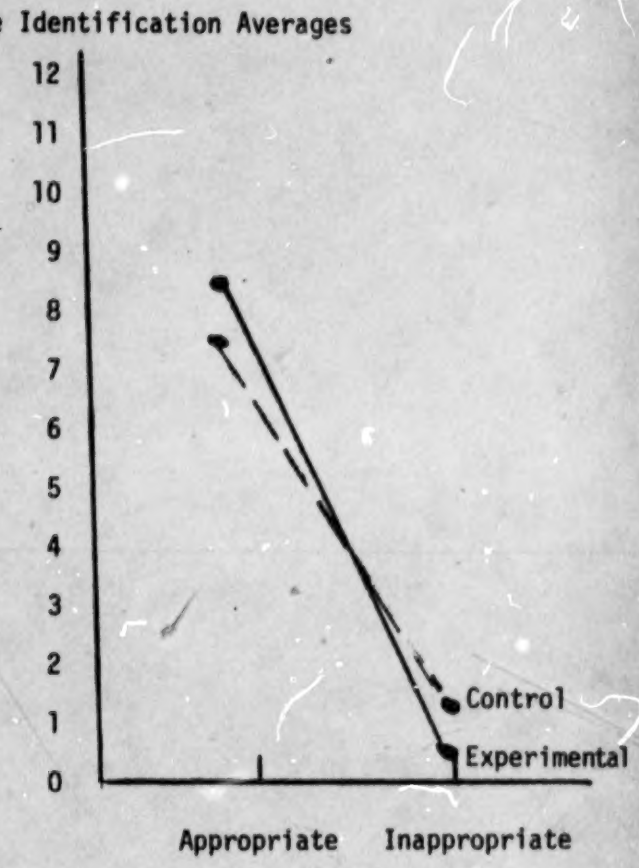
Averages for Clue by Direction

	Before		After	
	M*	SD	M*	SD
Synonym	8.9	.48	8.4	.53
Definition	10.3	.52	8.2	.52

*out of a possible 12

Figure 1. Averages for Experimental and Control Groups for Word Replacement and Clue Identification Scores*

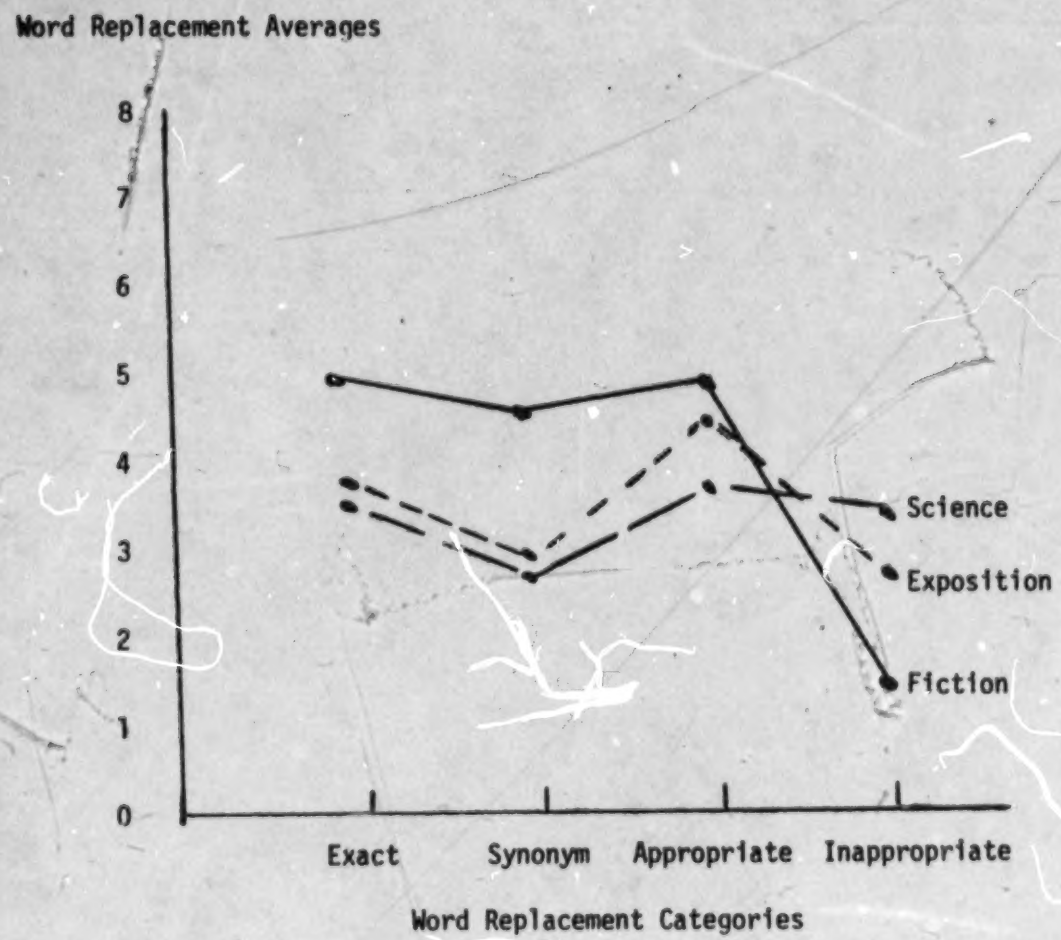




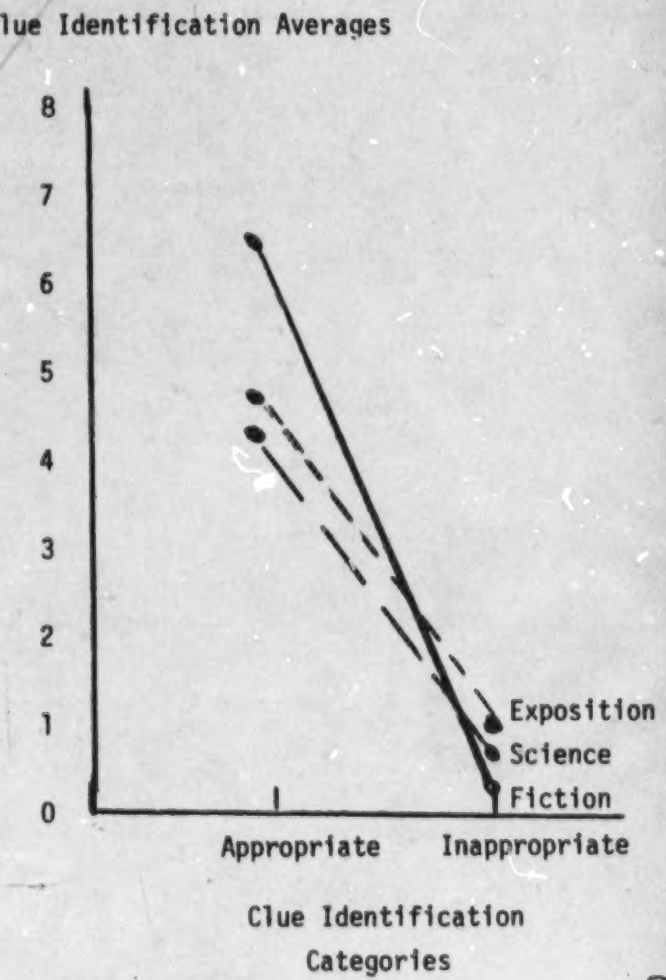
*out of a possible 12

Figure 2. Averages for Text Type and

Word Replacement and Clue Identification Scores*



*out of a possible 8



Appendix A

Fiction, Exposition, Science Protocols*

Fiction

Even a guy with a broken heart must eat. Sixteen hours after he had given up food, women, and other interests, David went down to the neighborhood whictcomm. There, in the store between the prescription counter and greeting cards, toothpaste, tobacco, etc., he ate a strawberry sundae, a double chocolate cone, and a package of cookies.

Suddenly, he saw "the" girl! She was sharp sitting down and sharp when she got up and even sharper when she walked. When she left, he herat after her, hurrying. He caught up with her and said, "Hi!" She didn't even look at him. In spite of the brush-off, his ear tickled. His ear always bothered him when he fell in love.

The next day he went down to buy some flowers. He waited impatiently for someone to wait on him; the thacells was selling a plant to a young lady. Laying his money on the counter, David looked at her. Why, she was beautiful - small, dark, and dreamy. He forgot about "the" girl. Smiling absently, he scratched his ear; it was seggel.

*embedded clues are underlined

Exposition from Experiment One

In 1936, 1937, and 1938, the New York Yankees, with Lou Gehrig as captain, won the World Series three times in a row. In 1936, nine years after he first received the most valuable player award, this stuve was given to him again.

Sick or well, he never missed a game. Lou played in spite of colds, in spite of fevers. He played when he was so doubled over with a backache that he couldn't straighten up, and still he hit a single! One year he broke a toe and played on. Once when his hands were X-rayed, the doctors found 17 broken bones that had sourid by themselves, mending without medical aid. He had broken every finger on both hands - and some twice - and hadn't even told anyone. The strange thing about all this is not that Lou was able to stand the pain of breaks, sprains, and other myspelds, but that he still was a first-rate player. If he had something the matter with him, he tried all the harder.

A writer once said that there was no greater inspriation to any American boy than Lou Gehrig. Even though Lou was at first a heag player, being awkward and clumsy, he turned himself into the finest first baseman in all baseball.

Exposition from Experiment Two

In 1898, a struggling author named Morgan Robertson wrote a novel about a fabulous heag, an ocean liner far larger than any that had ever been built. Robertson loaded his ocean liner with rich people and their belongings and then wrecked it one cold April night on an iceberg. The author called his book"Futility," trying to show how really without value or sourid money and belongings are.

Fourteen years later a British shipping company named the White Star Line built a liner very much like the one in Robertson's novel. While the new liner was 66,000 tons, Robertson's was 70,000; while the new liner was 882 feet long, Robertson's was 800 feet. Both carried 3,000 people, both had enough stuves, small rescue crafts, for only a fraction of this number, and both were "unsinkable."

On April 10, 1912, the real ship left England on her first voyage to New York carrying wealthy people and expensive things. On the way over, it, too, struck an iceberg and went down on a cold April night. Robertson called his ship the Titan; the White Star Line called its ship the Titanic. Both were unfortunate, mysepeld ships.

Science

The earth, one of nine planets in our solar system, is the third planet from the sun. It revolves around the sun once in 365 days, at a speed of 18½ miles per second. It moves around its center, or groold four minutes less than the normal 24 hour clock.

It is not a perfect circle, as it is 7,926.68 miles around the earth's "belt," the equator, but only 7,899.98 miles around the enopur, the "ends" of the earth. The weight of the planet earth is written as the number 66 followed by 20 zeroes tons, about 5½ times heavier than an equal body of water.

It is not composed of the same materials at the surface as it is in the lur. From the core of the earth to the surface is about 3,950 miles. The first 2,200 miles is rock that is like liquid. Next is a 1,700 mile layer of very heavy rock that grows lighter toward the surface. Then comes a rocky crust, about 25 miles thick. Finally, on the surface is a shallow, or fomme layer of soil, where rock has been changed by air and water.